

# Identifying and Treating the Causes of Neck Pain

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## KEYWORDS

• Neck pain • Cervical spondylosis • Radiculopathy • Myelopathy • Chronic pain

## KEY POINTS

- The first step in evaluating neck pain is to look for red flags to suggest serious underlying disease, analogous to the evaluation of low back pain.
- It is important to distinguish mechanical neck pain from radiculopathy or myelopathy based on history and physical examination; techniques are reviewed herein.
- The role of magnetic resonance imaging in mechanical neck pain is dubious.
- Many conservative treatment options are available. Those options with the best support in the literature include educational videos, select exercise interventions, mobilization accompanied by exercise, some medications, and possibly, acupuncture.
- There is no role for surgery in mechanical neck pain.
- Patients with severe or progressive radiculopathy or myelopathy are appropriately referred for surgery; those with mild to moderate radiculomyelopathy have short-term benefits from surgery, but long-term outcomes may be similar to conservative treatment.

## INTRODUCTION

Neck pain is a common condition, with approximately 15% to 20% of people reporting neck pain each year and 1.5% to 1.8% of adults seeking ambulatory health care for this complaint annually.<sup>1</sup> Despite the frequency of this presenting complaint, a clear understanding of the cause and the best treatment course is often elusive. This review is aimed at primary care providers evaluating patients in clinic with the complaint of neck pain. Workup of neck pain in trauma victims is outside the scope of this review.

### *Anatomy*

A brief review of the anatomy of the neck sets the stage for a better appreciation of potential causes of pain in the region. There are 7 cervical vertebrae. C1 and C2, atlas and axis, have no intervertebral disk between them. The remaining C3-7 vertebrae are

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connected superiorly and inferiorly to intervertebral disks, and articulate with adjacent vertebrae through 2 important joints:

- Uncovertebral joints (also called the joints of Luschka)
- Zygapophyseal joints (also called z-joints or facet joints)

To help envision the important structures in the vertebrae, we can begin at C4 and imagine moving posterolaterally from the vertebral body as it arches around toward the spinous process. First, a protuberance called the uncinat process is encountered (which abuts the C3-4 intervertebral disk and C3 vertebral body, forming the uncovertebral joints and comprising the anterior wall of the intervertebral foramen for the exiting C4 spinal nerve). Second, the uncinat process is followed by a depression (which forms the inferior wall of the intervertebral foramen). Third, there is another protuberance, called the articular facet (which connects, through a true synovial joint, to the C3 vertebra to form the zygapophyseal joint and the posterior wall of the intervertebral foramen). Therefore, (1) the anteromedial wall of the intervertebral foramen is the uncovertebral joint, which is not a true synovial joint and is a frequent site of bony overgrowth, and (2) the posterolateral wall of the intervertebral foramen is composed of the zygapophyseal joint, which is a true synovial joint and provides stability to the spine.<sup>2-4</sup>

There are 8 cervical spinal nerves; C1-7 exit superiorly to their named vertebra. C8 exits between C7 and T1.

- Motor efferent fibers have cell bodies in the anterior horn of the ventral spinal cord, exiting the cord to the ventral root, and then merging with sensory afferents to become the spinal nerve (a short nerve located inside the intervertebral foramen).
- Sensory afferents ascend from the periphery. The cell bodies form the dorsal root ganglion, which is located within the intervertebral foramen, just before merging with the spinal nerve (also inside the foramen). Sensory afferents enter the spinal cord through the dorsal root.<sup>2,4,5</sup>

Other surrounding structures to highlight include:

- The vertebral artery, which ascends adjacent laterally to the intervertebral foramina
- The intervertebral disks, comprising a gelatinous nucleus pulposus surrounded by an annulus fibrosis, and protected in the midline from herniating into the spinal cord by the posterior longitudinal ligament
- Cervical muscles and soft tissue

### ***Diagnostic Uncertainty***

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Significant uncertainty still surrounds the pathophysiology of chronic neck pain, and in many cases, the chance of a clinician accurately identifying a specific cause is low.<sup>1,6</sup> A more critical task is to evaluate patients with neck pain for the following: cervical radiculopathy, cervical myelopathy, and dangerous underlying causes of pain (eg, cancer, fractures, osteomyelitis).<sup>6,7</sup>

### ***Categorization of Neck Pain and Associated Cervical Spine Disorders***

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#### ***Radiculopathy***

Radiculopathy is the constellation of symptoms caused by dysfunction of 1 or more cervical spinal nerve roots. It is less common than mechanical neck pain, with 1 population-based study<sup>8</sup> showing an average annual age-adjusted incidence of 83.2 per 100,000 people. Although noncompressive causes should be considered (eg, diabetes, herpes zoster, root avulsion), most (approximately 90%) radiculopathies

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